Prof. Theodore S. Sorensen



A Tribute

on the occasion of his 75th birthday

Theodore S. Sorensen was born in the Peace River Country of Northern Alberta, Canada, on June 6, 1934. He received his B.Sc. with first class Honors in Chemistry from the University of Alberta in 1956. His first taste of research came during summer research positions at the Defense Research Board Laboratories in Dartmouth, Nova Scotia in 1955 and Shirley Bay, Ontario, in 1956. Ted pursued graduate studies in Chemistry, enrolling in the Ph. D. program at the University of Wisconsin. He worked under the supervision of Edward M. Kosower on the synthesis of 1,2- and 1,4-dihydropyridines and received his Ph.D. degree in 1960. He was then awarded the prestigious three year I.C.I. Fellowship for postdoctoral studies with Professor C. Eaborn at the University of Leicester. After the second year, he accepted an offer of a position as Assistant Professor at the fledgling University of Calgary, and rose rapidly through the ranks, becoming Full Professor in 1973. He held visiting professorships at Canterbury University (1967) Australian National University (1971-2), University of Sussex (1978-9) and University of Erlangen (1979). He is a member of the American Chemical Society and the American Association for the Advancement of Science, and a Fellow of the Chemical Institute of Canada. He has been a member of the Editorial Advisory Board of the Canadian Journal of Chemistry (1979-81), and served on the organizing committee of numerous national and international conferences

The synthesis, and kinetic, thermodynamic, stereochemical, and spectroscopic studies of electron deficient compounds, and carbocations in particular, have had a profound impact on understanding all aspects of chemical structure and reactivity in organic chemistry as recognized by the award of several Nobel Prizes. Ted Sorensen has many outstanding and seminal contributions in the area of carbocation chemistry over the last forty years. He had discovered and demonstrated the stereochemistry of pericyclic reactions in divinyl carbocations a few years before Woodward and Hoffmann became household names. His work on the mechanisms of rearrangements of numerous carbocations and specifically norbornyl cations, and the fluxional

behaviour of cyclopropylcarbinyl cations, played a key role in resolving correctly the longstanding classical *vs* non-classical controversy of carbocation structure. He was the first to discover hydrido-bridged cations. These are novel systems whose basic structure may be regarded as a hydride *anion* sandwiched between and stabilized by *two* cationic centers. Ted Sorensen's discovery of these systems, and elucidation of their structure and bonding has broad implications on the chemical reactivity of supposedly inert C-H bonds under Lewis acidic conditions as occurs in many guises in the fields of organic and organometallic chemistry, not to mention catalysis in the petrochemical industry. He demonstrated and explained the unique role of cyclopropyl groups in the stabilization of electron-deficient sites. There are no fewer than ten citations in March's, *Advanced Organic Chemistry*, the bible of organic chemistry, on this and other aspects of his carbocation studies. Discoveries of distinct conformations in apparently simple structures such as 2-adamantyl and 1-cyclohexyl cations will have similar impact in a much broader context. In short, his work in the field of carbocation chemistry continues to refine, even redefine, structural thinking in organic chemistry.

A long-standing interest in organometallic carbocationic systems has led to his discovery of a versatile class of nucleophiles and a new method for the synthesis of ketenes and cyclopropanones, including a first observation of a bicyclo[1.1.0]butanone. Ted Sorensen has discovered that these bicyclic ketones and certain substituted cyclopropanones have strongly pyramidal carbonyl groups, a discovery which has ramifications for explaining and predicting the stereochemistry of arguably the single most important reaction class in organic chemistry, nucleophilic addition to carbonyl compounds.

Ted Sorensen's research is characterized by numerous other important contributions to a solid foundation for scientific enquiry, among them, refinement of superacid/nmr techniques for the observation of reactive intermediates, nmr kinetic studies of hidden exchange processes and molecular rearrangements, new techniques for the *in situ* preparation of reactive species, and examination of the chirality and aromaticity of arene metal tricarbonyl and related complexes. At all stages his research has been supported by detailed studies of structures and mechanisms by high-level theoretical calculations.

Ted Sorensen has been internationally recognized in the form of a feature article in Accounts of Chemical Research, six invitations to write book chapters and numerous invitations to speak at International conferences. Sorensen is very worthy of a commemorative issue of ARKIVOC.

Silvio Buscemi

Selected Publications

1. Sorensen, T. S. The synthesis and reactions of divinyl carbonium ions. *Canad. J. Chem.* **1964**, *42*, 2768.

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